

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): An image processing apparatus comprising:

an optical arrangement configured to optically obtain a plurality of first images of an object to be rendered from a plurality of different photographing directions and second images that pertain to distance information of the object to be rendered;

a memory which stores the plurality of first images and second images;

a geometrical shape model generation unit which generates a geometrical shape model of the object to be rendered on the basis of the second images using a plurality of voxels;

a microfacet generation unit which generates a plurality of microfacets as two dimensional elements that are each centered inside a respective voxel ~~in a manner to approximate a three-dimensional shape of the geometrical shape model;~~

a billboard processing unit which rotates the plurality of microfacets to keep the plurality of microfacets substantially vertical to a view direction ~~to make a predetermined angle with a view direction;~~ and

a texture mapping unit which generates a third image associated with the object to be rendered in correspondence with the view direction by selecting texture images for respective microfacets from the plurality of first images on the basis of the plurality of photographing directions and view direction, and by projecting the selected texture images onto the microfacets.

Claim 2 (Canceled).

Claim 3 (Previously Presented): An apparatus according to claim 1, wherein the geometrical shape model generation unit controls the number of voxels to be generated on the basis of precision of the second images.

Claim 4 (Previously Presented): An apparatus according to claim 1, further comprising a clipping processing unit which appends geometry information to each pixel of the plurality of first images on the basis of the second images, and executes a clipping process of the plurality of first images on the basis of the geometry information of each pixel of each first image and a distance from a viewpoint to each voxel.

Claim 5 (Original): An apparatus according to claim 1, further comprising an interpolated image generation unit which selects at least two first images in ascending order of angle that the view direction and the plurality of photographing directions make, and generates an interpolated image on the basis of the at least two first images, and

wherein the texture mapping unit selects the texture images for respective microfacets from the plurality of first images or the interpolated image on the basis of the plurality of photographing directions and view direction, and projects the selected texture images onto the microfacets.

Claim 6 (Original): An apparatus according to claim 5, further comprising a clipping processing unit which appends geometry information to each pixel of the plurality of first images and the interpolated image on the basis of the second images, and executes a clipping process of the plurality of first images on the basis of the geometry information of each pixel of each first image and the interpolated image, and a distance from a viewpoint to each voxel.

Claim 7 (Original): An apparatus according to claim 4, wherein the clipping processing unit comprises graphics hardware.

Claim 8 (Currently Amended): An image processing method comprising:
optically obtaining a plurality of first images by photographing an object to be rendered from a plurality of different directions, and optically obtaining second images that pertain to distance information of the object to be rendered;
generating a geometrical shape model of the object to be rendered on the basis of the second images using a plurality of voxels;
generating a plurality of microfacets as two dimensional elements that are each centered inside a voxel ~~in a manner to approximate a three dimensional shape of the geometrical shape model;~~
executing a billboarding process that rotates the plurality of microfacets to keep the plurality of microfacets substantially vertical to a view direction ~~make a predetermined angle with a view direction;~~ and
generating a third image by selecting texture images for respective microfacets from the plurality of first images on the basis of the plurality of photographing directions and the view direction, and by projecting the selected texture images onto the microfacets.

Claim 9 (Canceled).

Claim 10 (Previously Presented): A method according to claim 8, wherein the step of generating the geometrical shape mode includes the step of controlling the number of voxels to be generated on the basis of precision of the second images.

Claim 11 (Previously Presented): A method according to claim 8, further comprising appending geometry information to each pixel of the plurality of first images on the basis of the second images, and executing a clipping process of the plurality of first images on the basis of the geometry information of each pixel of each first image and a distance from a viewpoint to each voxel.

Claim 12 (Original): A method according to claim 8, further comprising selecting at least two first images in ascending order of angle that the view direction and the plurality of photographing directions make, and generating an interpolated image on the basis of the at least two first images, and

wherein in texture mapping, the texture images are selected for respective microfacets from the plurality of first images or the interpolated image on the basis of the plurality of photographing directions and view direction, and the selected texture images are projected onto the microfacets.

Claim 13 (Original): A method according to claim 12, further comprising appending geometry information to each pixel of the plurality of first images and the interpolated image on the basis of the second images, and executing a clipping process of the plurality of first images on the basis of the geometry information of each pixel of each first image and the interpolated image, and a distance from a viewpoint to each voxel.

Claim 14 (Currently Amended): A computer program product comprising a computer storage medium configured to store program instructions for generating a desired image from a predetermined view direction in association with an object to be rendered using a plurality of first images obtained by photographing the object to be rendered from a plurality of

different directions, and optically obtained second images that pertain to distance information of the object to be rendered, on a computer system enabling the computer system to perform functions of:

generating a geometrical shape model of the object to be rendered on the basis of the second images using a plurality of voxels;

generating a plurality of microfacets as two dimensional elements that are each centered inside a respective voxel ~~in a manner to approximate a three dimensional shape of the geometrical shape model;~~

executing a billboarding process that rotates the plurality of microfacets to keep the plurality of microfacets substantially vertical to a view direction ~~make a predetermined angle with a view direction;~~ and

generating the desired image by selecting texture images for respective microfacets from the plurality of first images on the basis of the plurality of photographing directions and the view direction, and by projecting the selected texture images onto the microfacets.

Claim 15 (Canceled).

Claim 16 (Previously Presented): A computer program product according to claim 14, wherein the geometrical shape model generation function controls the number of voxels to be generated on the basis of precision of the second images.

Claim 17 (Previously Presented): A computer program product according to claim 14, enabling the computer system to further perform a function of appending geometry information to each pixel of the plurality of first images on the basis of the second images,

and executing a clipping process of the plurality of first images on the basis of the geometry information of each pixel of each first image and a distance from a viewpoint to each voxel.

Claim 18 (Original): A computer program product according to claim 14, enabling the computer system to further perform a function of selecting at least two first images in ascending order of angle that the view direction and the plurality of photographing directions make, and of generating an interpolated image on the basis of the at least two first images, and

wherein the third image generation function selects the texture images for respective microfacets from the plurality of first images or the interpolated image on the basis of the plurality of photographing directions and view direction, and projects the selected texture images onto the microfacets.

Claim 19 (Original): A computer program product according to claim 18, enabling the computer system to further perform a function of appending geometry information to each pixel of the plurality of first images and the interpolated image on the basis of the second images, and executing a clipping process of the plurality of first images on the basis of the geometry information of each pixel of each first image and the interpolated image, and a distance from a viewpoint to each voxel.